OPTICAL FOURIER SYSTEMS AND METHODS FOR MEDICAL IMAGE PROCESSING

ABSTRACT OF THE DISCLOSURE

A preferred embodiment optical system for processing a medical image includes an input image, a light source emitting a light beam which is directed at the input image, a first Fourier optical transformer receiving and focusing the light beam, and at least one spatial filter disposed at a focal plane of the Fourier lens to generate a filter Fourier spectrum. The system further includes a second optical Fourier transformer receiving the filtered Fourier spectrum and generating an inverse Fourier transform that results in a processed image. The system includes an image sensor to detect the processed image and generate an electronic representation of the processed image. In an embodiment, the input image is a two-dimensional image generated by a medical imaging method such as, for example, a mammogram or an image of a Pap smear. The input image can be generated by at least one of an x-ray, magnetic resonance, computerized axial tomography and ultrasound imaging method. The light source can be a laser, such as a diode pumped laser emitting light radiation having a wavelength in the range of 300 to 800 nm.